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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/803,177 | 03/17/2004 | Norman R. Wainwright | CHR-004 | 4155 |

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| EXAMINER | |
|---|---|
| BOWERS, NATHAN ANDREW | |
| **ART UNIT** | **PAPER NUMBER** |
| 1744 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 04/17/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/803,177 | WAINWRIGHT ET AL. | |
| | Examiner | Art Unit | |
| | Nathan A. Bowers | 1744 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-14 and 79* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 79* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *020707*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1) Claim 79 is rejected under 35 U.S.C. 102(b) as being anticipated by Mahiout (WO 9953322).

Mahiout discloses a cartridge for determining the presence of a microbial contaminant in a sample. The cartridge comprises a housing defining a fluid inlet port, an optical cell (5), and a conduit having a fluid contacting surface for providing fluid flow communication between the fluid inlet port and the optical cell. Hemocyte lysate is disposed on a region (1) of the fluid contacting surface of the conduit, so that when a sample is applied to the fluid inlet port, the sample traverses the region and solubilizes the hemocyte lysate during transport to the optical cell. This is described on pages 1, 3-5, 8 and 9. Mahiout further states that a chromogenic substrate is disposed on a second region (2) downstream from the first region (1). This is described on pages 8 and 9 and is depicted in Figure 1.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2) Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahiout (WO 9953322) in view of Tanaka (US 5550030).

With respect to claim 1, Mahiout discloses a cartridge for determining the presence of a microbial contaminant in a sample. The cartridge comprises a housing defining a fluid inlet port, an optical cell (5), and a conduit having a fluid contacting surface for providing fluid flow communication between the fluid inlet port and the optical cell. Hemocyte lysate is disposed on a region (1) of the fluid contacting surface of the conduit, so that when a sample is applied to the

fluid inlet port, the sample traverses the region and solubilizes the hemocyte lysate during transport to the optical cell. This is described on pages 1, 3-5, 8 and 9. Mahiout, however, teaches that the hemocyte lysate is not disposed directly dried on the fluid contacting surface of the conduit, but rather states that the lysate is disposed on a packing material within the conduit.

Tanaka discloses a method for creating an endotoxin specific assay using a hemocyte lysate. Column 2, line 50 to column 3, line 48 state that an endotoxin sensitive factor is immobilized on an insoluble carrier in order to create a dry analytical instrument. Column 6, lines 4-8 state that the insoluble carrier is in the form of a chip or microplate. Column 2, lines 35-37 indicate that it is well known in the art that hemocyte lysates are can be dried directly upon the wells and channels of microfluidic devices.

Mahiout and Tanaka are analogous art because they are from the same field of endeavor regarding endotoxin assays.

At the time of the invention, it would have been obvious to dispose the hemocyte lysate reagent disclosed by Mahiout directly on the fluid contacting surface of the conduit through a drying process. Tanaka teaches that the use of hemocyte lysates arranged directly on the surfaces of microfluidic devices is well established in the art. It would have been beneficial to alter Mahiout's apparatus in this way in order to alleviate any sample flow difficulties that result from the use of packing materials.

With respect to claims 2 and 3, Mahiout and Tanaka disclose the apparatus in claim 1. Mahiout further states that a chromogenic substrate is disposed on a second region (2)

downstream from the first region (1). This is described on pages 8 and 9 and is depicted in Figure 1.

With respect to claims 4-6, Mahiout and Tanaka disclose the apparatus in claim 1. Mahiout further states that a preselected amount of bacterial endotoxin is disposed on the first region of the fluid contacting surface of the conduit. Mahiout teaches on pages 3 and 5 that the endotoxin reacts with lysate reagents in the first region, and is transported by flow through the cartridge.

3) Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahiout (WO 9953322) in view of Tanaka, and further in view of either Numazawa (EP 121868) or Parce (US 6306659).

Mahiout and Tanaka disclose the apparatus as previously described above, however Mahiout only discloses the use of a single fluidic conduit comprising an inlet port, an optical cell and a reagents.

Numazawa discloses a housing (Figure 7:8) defining a first fluid inlet port, a first optical cell, and a first conduit (1) having a fluid contacting surface for providing fluid flow communication between the first fluid inlet port and the first optical cell. A second fluid inlet port, a second optical cell, and a second conduit (1) having a first contacting surface for providing fluid flow communication between the second fluid inlet port and the second optical cell. First and second hemocyte lysate reagents (2) are disposed on first regions of the first and second conduits so that when sample is applied to each of the inlet ports, the sample will traverse

the regions and solubilize the hemocyte lysate during transport. This multi-conduit system is described on page 10.

Parce discloses an apparatus for screening biological samples for the presence of a specific analyte. Parce states in column 2, line 65 to column 3, line 62 that a compound is delivered through a conduit on a microfluidic substrate where it is allowed to interact with various chemicals and reagents. Column 9, lines 17-55 indicate that, in this way, sample solutions are analyzed for the presence of bacteria and microorganisms. A detection window (116) is provided for optically interrogating the sample after it has been affected by the added reagents. Column 24, line 63 to column 25, line 36 and column 30, line 30 to column 31, line 24 state that a plurality of conduits are arranged in parallel for conducting identical reactions simultaneously.

Mahiout, Tanaka, Numazawa and Parce are analogous art because they are from the same field of endeavor regarding microorganism detection systems.

At the time of the invention, it would have been obvious to incorporate a plurality of conduits in the system proposed by Mahiout, wherein each conduit includes a fluid inlet port, an optical cell, and a region defined by hemocyte lysate. Numazawa and Parce teach that parallel assay geometries are beneficial because they increase throughput and efficiency. This modification would only require the duplication of parts already disclosed as known by Mahiout, and therefore is considered to be an obvious improvement.

***Response to Arguments***

Applicant's arguments filed 07 February 2007 with respect to the 35 U.S.C. 102 rejections involving Numazawa have been fully considered and are persuasive. These rejections have been withdrawn.

Applicant's arguments filed 07 February 2007 with respect to the 35 U.S.C. 102 rejections involving Mahiout have been fully considered and are persuasive. It is agreed that Mahiout does not teach *drying* the lysate onto a fluid contacting surface of the capillary tube. The term *drying* clearly indicates that the lysate is applied directly to the fluid contacting surface of the tube, whereas the term *disposed* simply indicates that lysate is adjacent to the fluid contacting surface. The lysate-containing packing of Mahiout results in a configuration in which the lysate is disposed next to the surfaces of the conduit, but not dried on the surfaces of the conduit. Therefore, these rejections have been withdrawn. However, upon further consideration, a new ground of rejection is made in view of the combination of Mahiout and Tanaka.

The Tanaka reference addresses the deficiencies of Mahiout by indicating that it is well known in the art to dispose a hemocyte lysate reagent directly to the fluid contacting walls of a microfluidic device. Although disposing reagents within a packing and drying reagents directly to a channel surface each are characterized by certain advantages and disadvantages, both of these arrangements are considered to be functionally equivalent mechanisms for encouraging a reaction in that both promote contact between an analyte in a sample and a reagent. One of ordinary skill in the art would know to assess these advantages and disadvantages, and accordingly choose the most effective arrangement.

Applicant's additional arguments filed 07 February 2007 regarding the 35 U.S.C. 102 rejection involving Mahiout have been fully considered but they are not persuasive.

*Applicant's principle arguments are*

*(a) Mahiout fails to teach or suggest an optical cell.*

In response to Applicant's arguments, please consider the following comments.

Mahiout clearly indicates in the Figures that the end region of the conduit is devoted to visualizing the reaction. This end region (Figure 1:5) is labeled as a "visual surface," and page 7 teaches that the end region comprises a colorant designed to facilitate optical interrogation. Therefore, Mahiout is considered to comprise an optical cell.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Tsuchiya (US 5750500) reference teaches the sate of the art regarding endotoxin specific assays that incorporate the use of dried hemocyte lysate reagents.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan A. Bowers whose telephone number is (571) 272-8613. The examiner can normally be reached on Monday-Friday 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gladys Corcoran can be reached on (571) 272-1214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NAB

GLADYS JP CORCORAN
SUPERVISORY PATENT EXAMINER